



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/784,977	02/16/2001	Seiya Takahashi	14328	3787

7590 02/19/2004

Paul J. Esatto, Jr.
Scully, Scott, Murphy & Presser
400 Garden City Plaza
Garden City, NY 11530

EXAMINER

GORDON, BRIAN R

ART UNIT	PAPER NUMBER
----------	--------------

1743

DATE MAILED: 02/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/784,977

Applicant(s)

TAKAHASHI ET AL.

Examiner

Brian R. Gordon

Art Unit

1743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 7-3-2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3-8, 11 and 14-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-8, 11, 14-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1, 3-8, 11, 14 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1, 3-8, 11, and 14-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Dependent claims 3-6, 8, 11, and 15-26, should begin with "The" instead of "A".

The apparatus claims (in particular independent claims 1 and 7) are written in a form that appears to imply that applicant is relying on how the device is used in a particular process as a basis for patentability. For example, both claims recite the phrase"

"after stopping the sending of the washing water by the washing means for forming an air layer in the inner portion of the liquid holding member by drawing a given amount of air into the inner portion of the liquid holding member from the one end, after the discharging of the washing water"

The phrase is a method step that acquires no weight in the patentability of structure claims and considered as intended use.

It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from

Art Unit: 1743

a prior art apparatus satisfying the claimed structural limitations. Ex parte Masham, 2 USPQ2d 1647 (1987).

It appears that applicant is intending to rely on a control device that is programmed to perform a specific method. In order for such a limitation to be considered within the limitations of an apparatus claim the controller and it's specific programmed function must be recited in the claim.

The examiner interprets applicant's invention as device and method in which a sample liquid is dispensed. It appears as if the interior of the liquid holding means is first washed with a washing solution and wherein a portion of the initial washing solution is dispensed (leaving a portion behind) or all of the used washing solution is dispensed from the holding means and more added thereto. In either of the cases an amount of washing solution is present in the holding means. Next, an amount of air is aspirated in the holding means forming a layer of air adjacent the washing solution. After such a sample liquid is then aspirated creating three fluid layers (washing solution, air, liquid sample) within the holding means. After the three layers are established, the liquid sample is dispensed by moving the liquid holding means forward and backwards along a dispensing direction.

As to claims apparatus claims 1,7 and method claims 14 and 27, it is not clear how the device is operated or what does applicant intends to claim as elements of the device.

As previously stated above the examiner interprets the invention as involving two liquids (a washing water and a sample liquid), however as the claims are presently drafted it is difficult to distinguish what liquid is being addressed for the claims refer to "a

Art Unit: 1743

liquid", "the liquid", and "washing water". The fact that "washing water" is a liquid makes it difficult to determine which liquid is being referenced in certain instances (for example see claim 7, next to last line "the liquid held to the liquid holding member").

Claims 1 and 7 were amended with the phrase below. For ease of understanding the basis of the 112 rejections, the examiner has placed comments and questions therein.

a washing means for washing the liquid holding member by sending washing water into the inner portion of the liquid holding member, means for dispensing the washing water held in the liquid holding member **[No antecedent basis for the water being held in the liquid holding member. Although the water is sent to the inner portion there is no previous statement indicating it remains therein]** from the one end after stopping the sending of the washing water by the washing means for forming an air layer in the inner portion of the liquid holding member by drawing a given amount of air into the inner portion of the liquid holding member from the one end, after the discharging of the washing water, means for sucking the liquid into the inner portion of the liquid holding member from the one end so as to make the washing water in a separated **[Separated from what?]** state through the air layer **[How is an air layer formed when the washing water was stated above as being dispensed? Is one to assume that not all of the washing water was dispensed? It is unclear what is meant by "separated through the air layer]**, and a driving means for dispensing the liquid held to the liquid holding member **[What liquid is held to the holding member? No antecedent basis that states a liquid is held to the holding member]** from the

one end thereof by moving the liquid holding member forward and backward along a dispensing direction.

Claims 7 and 17 recite "dispensing on a substrate a minute volume of liquid including probes capable of being connected for a target substance in the peculiarity,"

It appears as if the liquid includes the probes. Furthermore, it is unclear what meant by the phrase: connected **for a target substance in the peculiarity**. To what are the probes connected?

There is no antecedent basis for "the liquid held" in claim 7, next to last line of page 7 of applicants amendment.

Claim 14 was amended with the phrase below (see also claim 27). For ease of understanding the basis of the 112 rejections, the examiner has placed comments and questions therein.

"liquid from one end of **the liquid holding member** [**No antecedent basis in the claim**] for holding the liquid therein, the liquid including probes capable of being connected for a target peculiarity, the micro array manufacturing method comprising a washing step for washing the liquid holding member by sending washing water into the liquid holding member, a step for stopping the sending of the washing water, a step for dispensing from the one end the washing water held in the inner portion of the liquid holding member [**No antecedent basis for the water being held in the liquid holding member. Although the water is sent to the inner portion there is no previous statement indicating it remains therein**], a step for forming an air layer [**How is an air layer formed when the washing water was stated above as being dispensed?**]

Is one to assume that not all of the washing water was dispensed? It is unclear what is meant by "separated through the air layer], in the inner portion of the liquid holding member by drawing in a given amount of air in the inner portion of the liquid holding member from one end of the liquid holding member, a step for sucking the liquid **[What liquid? Washing water?]** into the inner portion of the liquid holding member from the one end so as to make the washing water in a separated state **[Separated from what?]** through the air layer, and a step for dispensing the liquid held to the liquid holding member from the one end on the substrate by moving the liquid holding member forward and backward along a dispensing direction.

3. The term "rapidly" in claims 6 and 21 is a relative term which renders the claim indefinite. The term "rapidly" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The term or phrase "stopping it rapidly" is relative to one's perspective. It is also unclear what "it" refers to in claims 6 and 21.

4. Claims 8 and 22 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: the structural relationship of "a liquid container" and the apparatus of the independent claims 1 and 7.

Art Unit: 1743

5. Claims 16 and 26 recite "the liquid discharge means moves the given amount of the liquid to a lower side". A lower side of what? There is no antecedent basis for "the given amount of liquid".

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 3-8, 14-16, 18-23, 25-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Kobashi et al. US 5,593,893.

Kobashi et al. discloses a dispensing device having a flexible tube provided with a pipetting nozzle (holding member) at an end, **a washing solution supplier 12 supplying washing solution** to the flexible tube and the pipetting nozzle, a syringe connected to another end of the flexible tube and a control section for controlling the **driving of the syringe**. The control section of the present invention includes a syringe driving compensator by which the washing solution is supplied into or discharged out of the syringe in an amount compensate for the variation in the inner volume of the tube caused by reduction in the liquid pressure when the washing solution is transmitted from the washing solution supplier into the flexible tube.

A dispensing device 1 mainly comprises a pipetting nozzle 2, a tube 3 connected to the upper end of the nozzle 2 and a syringe 4. The pipetting nozzle 2 is secured to a supporting arm 5 (driving means) which is movable in three axis direction by a driving

Art Unit: 1743

means (not shown). The pipetting nozzle 2 has a **tapered opening** at the bottom. The tube 3 is connected to the pipetting nozzle 2 at the other side of the tapered end of the pipetting nozzle 2, and connected to the syringe 4 at an end which is not connected to the pipetting nozzle 2.

As shown in FIG. 6, an air layer a having a small thickness is formed on the tip of the pipetting nozzle 2. The **air layer a works to separate the sample from the washing solution** in the pipetting nozzle 2. The expanded tube 3 gradually regains its initial shape by its own elasticity.

Kobashi et al. disclose all of structural elements of the claimed apparatus. While the function of each element is not explicitly disclosed as that of applicant, the examiner asserts that the device inherently functions as claimed by applicant.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 11 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobashi et al. as applied to claims 1, 3-8, 14-16, 18-23, 25-27 above, and further in view of Rose et al. US 6,551,557.

Kobashi et al. does not teach that the device comprises a member for adding thermal energy.

Rose et al. disclose a ceramic tip and a random access print head for the transfer of microfluidic quantities of fluid. The print head can randomly collect and deposit fluid samples to transfer the samples from a source plate to a target. The print head can also be programmed to create a direct map of the fluid samples from the source plate on the target or to create any desired pattern or print on the target. The tip and print head can be used for a wide variety of applications such as DNA microarraying and compound reformatting. In one preferred embodiment, the tip is used as a capillary or "gravity" pin to draw or collect source fluid and "spot" or deposit the fluid onto the target via physical contact (touch-off). In another preferred embodiment, the tip is used in conjunction with

an aspirate-dispense system to actively aspirate source fluid and deposit the fluid via a contact or non-contact approach.

The contact transfer tip generally comprises a substantially cylindrical upper body portion, a substantially tapered lower body portion and a lumen cavity. The substantially cylindrical upper body portion has a first outside diameter. The substantially tapered lower body portion has a second outside diameter at a transition portion thereof which is substantially equal to the first outside diameter of the upper portion. The substantially tapered lower body portion further has a third diameter at a lower-most end thereof which is smaller than the first or second diameters and which approximately equals the diameter of a spot or dot of fluid desired to be deposited onto the target substrate.

In use, initially all the tips 200 (FIG. 3) are raised by energizing the solenoids 238. The print head 230 is positioned and aligned over the source 29 by utilizing the robot arm 252 and/or the movable platforms 254. For random access collection, a first tip 200 is lowered by de-energizing or turning off the corresponding solenoid 238. The first tip 200 dips into a microwell of the source plate 29 to draw fluid by capillary action. The first tip 200 is raised by energizing the corresponding solenoid 238. Relative motion is provided between the source plate 29 and the print head 230, by the robot arm 252 and/or the movable platform 254, to align a second tip 200 with a corresponding microwell of the source plate 29. The second tip 200 is lowered and collects source fluid from the microwell. The second tip 200 is then raised. Subsequent tips 200 are lowered and raised in a similar manner. This random access collection process is continued until all the tips 200 are loaded with the sample fluid.

Referring to FIG. 7, the syringe pump 22 is connected to the reservoir 16 and the dispenser 12 using tubing 23 provided with luer-type fittings for connection to the syringe and dispenser. Various shut-off valves 25 and check valves (not shown) may also be used, as desired or needed, to direct the flow of fluid 14 to and/or from the reservoir 16, syringe pump 22 and dispenser 12.

In one form of the present invention a solenoid dispenser 12, schematically illustrated in FIG. 11, is preferred. Referring to FIG. 11, the solenoid valve dispenser 12 generally comprises a solenoid-actuated drop-on-demand valve 20, including a valve portion 34 and a solenoid actuator 32, hydraulically coupled to the tube or tip 200 of the present invention. The nozzle 214 of the tip 200 serves as the aspirating and dispensing nozzle. The solenoid valve 20 is energized by one or more electrical pulses 13 provided by a pulse generator 19 to open and close the valve 20 at a predetermined frequency and/or duty cycle. A detailed description of one typical solenoid-actuated valve can be found in U.S. Pat. No. 5,741,554, incorporated herein by reference. The tip (FIGS. 1 and 7) of the present invention may also be used in conjunction with a number of other dispensers well known in the art for dispensing a liquid, such as a piezoelectric dispenser (deforms internal shape of the holding member), a fluid impulse dispenser, a heat actuated dispenser (device for adding thermal energy) or the like.

It would have been obvious to one of ordinary skill in the art at the time of the invention to recognize that the device may be modified to incorporate a heating means such as that taught by Rose et al. for heated dispensers readily employed in the art for dispensing liquids.

Art Unit: 1743

Conclusion


12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Astle, Feygin, Babson et al., Schwartz, and Stokes disclose dispensing devices.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian R. Gordon whose telephone number is 571-272-1258. The examiner can normally be reached on M-F, with 2nd and 4th F off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on 571-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

brg


Jill Warden
Supervisory Patent Examiner
Technology Center 1700